

Cardiac Valve Replacement

The Rationale for Earlier Operation

DURING the past decade there has been a progressive reduction in the operative risk of valve replacement, even in patients with far-advanced heart disease. This has given us the opportunity to study the late results in a balanced group of survivors, including many poor-risk patients. As noted by Carey and associates, in this issue of *THE WESTERN JOURNAL OF MEDICINE*, there is a significant late mortality due to progressive heart disease unrelated, for the most part, to specific prosthetic complications. Furthermore, the restoration of satisfactory valve function does not restore the functional Class I or II status to all long-term survivors. On the contrary, many patients who survive for extended periods of time remain significantly limited in exercise tolerance.

The authors rightly feel, in view of these results, that it is proper at this stage in the development of valvular surgery to review our current thinking with regard to the indications for earlier operation. They point out that perhaps the timing of operation should depend upon specific features of the patient's disease that bear on the late results, such as cardiac mass, cardiac dilatation and evidence of ventricular dysfunction—rather than pre-operative functional classification.

Our own experience very much supports this view. For mitral valve replacement, for example, the operative mortality for the non-cloth-covered ball-valve prosthetic device (6120) implanted from 1965 to 1968 was 10 percent. With the various cloth-covered mitral prosthetic valves (6310-20-40) implanted from 1968 to the present, the operative mortality is 5 percent in 297 such patients. Late mortality and morbidity is best viewed using an actuarial technique. Relative survival curves can be derived by adjusting the actuarial survival by the expected survival corrected for age and sex. Using this technique in a group of 329 patients with isolated mitral valve replacement surviving operation, including both non-

cloth-covered and cloth-covered prosthetic devices, the 5-year relative survival rate is 85 percent, and the 8-year survival rate is 80 percent. Of 24 late deaths in the cloth-covered series, eight were due to arrhythmias or congestive heart failure, and only two were prosthetic-related due to endocarditis. Of 14 deaths in the non-cloth-covered group six were due to congestive failure or arrhythmia, and only four were prosthetic-related (embolism in three, endocarditis in one).

In a report of the University of Oregon Medical School, patients with mitral valve replacement were analyzed by computer, and poor late functional results were clearly related to the duration of disability, the history of previous mitral surgery and the presence of tricuspid regurgitation, rather than to specific complications related to the prosthetic heart valves. However, specific complications must be taken into consideration in weighing the risks of valve replacement against the risks of deferring the operation. Fortunately, with the current generation of cloth-covered mitral prosthetic valves in use since 1968, the actuarial risk at five years of embolus is 3 percent, infection 2 percent, reoperation 4 percent. Thus, operations should be, ideally, performed before disability has been too prolonged, and before functional tricuspid regurgitation has developed. On the basis of this information we currently recommend surgical operation for patients in early functional Class III.

Our results with aortic valve replacement are also similar to the authors', with an operative mortality for the current cloth-covered aortic prosthetic valve (Model 2400) of 5 percent compared to an earlier operative mortality of 12 percent. The late relative survival including all aortic prosthetic valves, both cloth-covered and non-cloth-covered in 437 patients is 75 percent at eight years for males. For females relative survival falls to 94 percent at two years but then rises to approximately 98 percent at eight years. As with mitral replacement congestive heart failure and arrhythmias are the most common causes of late deaths. With cloth-covered valves, for example, only seven of 38 late deaths were prosthetic-related (embolus in five and endocarditis in

two). For patients receiving anticoagulants with cloth-covered aortic prosthetic valves, the actuarial incidence of embolism is zero at five years compared with 18 percent with non-cloth-covered valves (Model 1200-1260). In terms of embolism per 1,000 patient-years of follow-up, there were four episodes for non-cloth-covered prosthetic valves, and ten episodes for cloth-covered in patients not receiving anticoagulant therapy. There were no episodes in 116 patients receiving anticoagulants who had a cloth-covered aortic prosthetic valve in place.

The actuarial incidence of infection is less than 4 percent at five years with cloth-covered valves. Specific complications, such as hemolytic anemia due to cloth tear have produced an actuarial reoperation rate of 8 percent at five years. However, current models of cloth-covered valves containing a track on the inner surface of each strut are free from this complication.

While our computerized review of aortic valve patients is not yet complete, cardiac mass and ventricular function appear to be the important determinants of the quality of life and functional classification after operation. On this basis it is our current policy to recommend valve replacement in Class I patients if there is a striking progression in cardiomegaly in presence of aortic regurgitation.

While medical considerations must play the dominant role in determining the timing of operation for chronic valvular heart disease, we must also consider the chance for social and economic rehabilitation. It has been our experience that patients who have been off work for more than six months before operation have a very poor chance of returning to work postoperatively, even if they have had an excellent physiological result.

Thus, we find ourselves in essential agreement with Carey and his associates. Cardiac valve replacement must be considered earlier in the course of the patient's disease in order to prevent the development of irreversible heart disease. Exactly how early this should be is the problem to be answered by each of us depending upon a balancing of the risks, both early and late, with each patient. The trend toward earlier operation is definitely here, and how far we extend it will depend upon a continuing analysis of the results we achieve.

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THE DESIRABILITY of better distribution of health manpower and particularly of physician manpower to underserved areas is widely accepted. Yet the most important action is where there is some density of physicians, other health manpower and health care resources. Many knowledgeable observers feel that there has been and still may be an overall physician shortage. And these are times when an unprecedented number of young Americans are seeking to become physicians, and an unprecedented number of foreign medical graduates are being admitted to this country and given licenses to practice here. And while medical educators are under increasing political pressure to provide educational opportunities for foreign medical graduates, they find themselves without the wherewithal to offer qualified Americans the opportunity to become physicians whether or not they come from medically underserved areas or cultures.

It is against this rather schizophrenic background that a variety of attempts are being made to strengthen health manpower and health care services in deprived or underserved areas. In those instances where major medical centers with a full complement of physicians and resources find themselves in or adjacent to major underserved areas, the effort has often been to develop models for health care delivery in these areas. This has occurred in Boston, Baltimore and Chicago, for example. There have also been delivery models developed in areas quite remote from major medical centers, but these seem to thrive best when they can somehow tap into the resources of a major medical center. Another, quite different and very important approach has been to decentralize medical and health care education to underserved areas. This has the advantage of bringing the educational processes to where the practice needs are and allows improvements in the distribution of health manpower and health care services to flow from this. This approach was pioneered on a national scale by Regional Medical Programs, which emphasized transferring the knowledge